One word more, if men will write nonsense, they might at least endeavour to write original nonsense. It is sad to think that even young ladies should have to admire the old empty sentences in every new book. S.

OUR BOOK SHELF

The Darwinian Theory and the Law of the Migration of Organisms. By Moritz Wagner; translated by J. L. Laird. (Sandford.)

AFTER the perusal of the preface to this pamphlet, the reader will expect to find that a serious objection to the Darwinian hypothesis has been detected, and that what is to follow will, by the introduction of a new law, clear up the assumed difficulty, and immortalise its discoverer.

"The Law of the Migration of Organisms" of Prof. Wagner is that it is only by the isolated migration of single individuals from the station of their species, that natural selection could and can be effected, and that only by this means new varieties of plants and animals could arise in the past as well as in the present. This law is based on the considerations that the greater the change to which individuals are subjected on migration from their homes to some fresh locality, the greater will be their tendency to vary, and the less they have the opportunity of crossing with the parent stock, the more permanent will variations become. Most of the observations on which these arguments are founded have been arrived at from the author's researches on the distribution of insects and plants; and he has been led to propose it, because, as he says, "Darwin's work neither satisfactorily explains the external cause which gives the first impulse to increased individual variability, and consequently to natural selection; nor that condition which, in connection with a certain advantage in the struggle for life, renders the new characteristic indispensable."

To us it is not easy to see what direct bearing this law has on the theory of natural selection, for it seems to be nothing but one of the many deductions of Lamarck's theory of the origin of species. It is evident that on that very ingenious but equally inefficient hypothesis, the removal of individuals from their homes to some other locality in which the temperature and food are different, would cause them to vary; and that if the so modified forms are allowed again to mix with those which have not altered their position, the induced peculiarities will disappear. But, though by artificial selection an apparently similar result may be attained, yet in a wild state this is hardly the sequence of events which the evolution hypothesis supposes. According to it, the forces which come into play affect large numbers, and being generally comparable in degree and gradual in their action, those individuals which escape change in one direction are almost certain to undergo some equally considerable modification in another; consequently there will at no time be left any of the original unmodified stock for the varieties to intermix with, as required in the theory under consideration, at the same time that the effect of simple change of locality in producing new and well-marked varieties has not been conclusively proved.

From the study of the breeds of horses and cattle, Prof. M. Wagner is convinced that the invariable result of intercrossing is uniformity, and that only in connection with isolation is natural selection able to come into play. This, as do many other remarks throughout this pamphlet, shows clearly that its author does not really recognise the point of Mr. Darwin's great theory, and that whilst under the idea that he is attempting to modify it, he is really discussing another, but distantly related, and much less important problem. Such being the case, it is not surprising that the author of the theory of Natural Selection should differ from the German professor; with whom we also cannot agree in thinking that "perhaps that generous British naturalist, who is always open to conviction, after calmly weighing his reasons and data, may yet be induced to modify his opinions."

A Practical Manual of Chemical Analysis and Assaying, as applied to the Manufacture of Iron from its Ores, and to Cast Iron, Wrought Iron, and Steel as found in Commerce. By L. L. de Koninck, Dr. Sc., and E. Dietz. Edited, with notes, by Robert Mallet, F.R.S., F.G.S., M I.C.E., &c. (London: Chapman and Hall, 1872.)

THE above little work appeared at Liège in 1871, and as it was well arranged, succinct, and clear in its descriptions, Mr. Mallet considered it worthy of translation. The plan is similar to that of Fresenius's well-known quantitative analysis, the reagents being described first, then the apparatus and operations, and then the practical application to the special class of work to which the book is devoted. On the whole we cannot help thinking that too much space is given to matter with which every person ought to be thoroughly familiar before he attempts to make a practical application of his chemical knowledge. The supercession of the skilled chemist by the "tolerably intelligent man" mentioned by the editor in his preface is not, we think, a desirable reform. The editor's notes consist of some four and twenty pages of small print at the end of the book, and they are full of valuable suggestions. His remarks on the construction and arrangement of the laboratory of an iron-work are particularly worthy of attention. The book concludes with a table of atomic weights, one for the conversion of English weights and measures, with their metrical equivalents, and one of constants for calculating percentages of substances found. The book will no doubt prove very useful in its special field.

Verhandlungen der k.-k. Zoologisch-botanischen Gesellschaft in Wien. Jahrgang, 1872, 22er Band. (Leipzig Brockhaus.)

THE annual volume of "Transactions of the Zoological and Botanical Society of Vienna" contains, as usual, a number of interesting and valuable articles. The papers are almost entirely systematic and descriptive:—On the flora of Poland (the longest paper in the volume); on birds from the shores of China and Japan; on the lichens of the Tyrol; on a collection of birds from Australia; on the bees of Germany; on North American Micro-Lepidoptera; on the oak-galls of Central Europe; and others of a similar character. Physiological or anatomical contributions occupy but a small portion of the volume, which is illustrated by seven plates.

The Art of Grafting and Budding. By Charles Baltet. (London: W. Robinson, 1873.)

THE various modes of the reproduction of plants comprised under the designations grafting, budding, layering, &c., have been more scientifically studied and carried to greater perfection by gardeners in France than in England. Baltet's "L'Art de Greffer" is the text-book on this branch of horticulture, and of this little volume we have here a translation, although the omission to note this fact on the title-page might give unwary purchasers who have not dipped into the preface the impression that it is an original work. M. Baltet is so successful a fruit-grower, and his manual is so well and favourably known, that no apology was necessary in furnishing the English reader with a translation of it, which will be an indispensable companion to all engaged in horticulture. At the end of the volume is a useful list of the more commonly grown trees and shrubs, with instructions as to the best kind of stock on which to graft them, and the method to be pursued; though it is a pity that the translator did not

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take the trouble to re-arrange them in some order more intelligible to the English reader than that of the alphabetical sequence of the common French names.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.*]

Dr. Bastian's Turnip-Cheese Experiments

FROM Dr. Bastian's letter in last week's NATURE I learn that my last communication has afforded him satisfaction. The gratification which I feel at this expression of his approval is mixed with some surprise; for however confirmatory my experiments may be of his, so far as relates to the bare fact that boiling is insufficient to destroy the germinating power of the turnip-cheese liquid, they certainly do not tell in favour of the inference which he is understood to draw from that fact.

The experiments which Dr. Bastian was kind enough to show me last December were regarded by him as unequivocal instances of spontaneous generation. He will remember that at that time I stated to him, both orally and in writing, that the significance of the results in their relation to the doctrine of heterogenesis, appeared to me to be doubtful, and that I thought it probable that they would be interpreted by different persons in opposite senses, according to their preconceived opinions. I expressed myself in a similar manner at a discussion which took place on the subject last winter at the Royal Society. It was for the purpose of clearing up this doubt that I made the experiments recorded in my last communication. I did not expect to prove that the production of Bacteria in Dr. Bastian's experiments was *not* spontaneous, but merely to determine whether the fact afforded any support to the opposite conclusion.

Having first shown that living organisms increase and multiply in the liquid in question, when boiled at the ordinary temperature, under circumstances which absolutely preclude the introduction of living matter from without, I prove that under otherwise similar conditions this result is not obtained when the liquid is subjected to ebullition at a slightly higher temperature. I show further that the liquid even when heated to 102°·5 C. suffers no impairment of its power of supporting the life of Bacteria, for by inoculating it with a drop of ordinary distilled water it at once becomes pregnant. Hence I conclude, not that spontaneous generation is impossible, but that the particular experiment in question is not an instance of it, and that no argument founded on it in favour of the doctrine is of the slightest value.

It is unnecessary for me to occupy your space by at any length adverting to the side questions raised by Dr. Bastian in the other paragraphs of his letter.

In examining the liquids within a few days after heating rather than later, I followed his own method.

I made no attempt to determine the temperature of ebullition in flasks with capillary orifices, because I know of no method by which it could be done accurately. Besides, it was not required for my purpose.

I employed the word "chance" in its ordinary sense. In the sentence to which Dr. Bastian refers I explained that, although there may be a limit of temperature at which a liquid, before possessing the power of breeding Bacteria, is deprived of that power, experiments such as mine are insufficient to define that limit. As regards the turnip-cheese liquid it has been shown that between the temperatures of 100° and 102° C., the probability of pregnancy diminishes rapidly as the temperature increases. It is not as yet possible to say at what point the probability vanishes.

University College, June 30 J. BURDON SANDERSON

The Zodiacal Light

CONTRARY to Mr. Hall's experience of astronomical books (see NATURE, vol. viii. p. 7), in neither Herschel's "Outlines of Astronomy," Humboldt's "Cosmos," nor Guillemin's "Heavens," can I find any hint of a permanent difference between the brightness of the zodiacal light east of the sun and west of it, though Arago's "Popular Astronomy" says that according to Cassini, "it is generally less lively and less extended in the morning than in the evening." But even if Cassini was correct, this is no positive proof of any difference between the two "branches" of the zodiacal light at the same time, seeing that he lived in the temperate zone, and probably did not observe it in both morning and evening at the same time of year. Mr. Hall's situation in Jamaica is favourable for investigating this point, and I should not wonder if he finds the fact different from what he supposes. But even the books that consider the zodiacal light to surround the sun in the shape of a lens, acknowledge that it may extend further one way than another, and further at one time than another. T. W. BACKHOUSE

Sunderland, June 7

AT about half-past one in the morning of June 5, the sky was clear, but the stars were not very brilliant, on account of the diffused light, and consequently the Eastern branch of the Zodiacal Light was very faint; as I was endeavouring to trace its course, a strong beam of light appeared so suddenly as to have quite a startling effect; it was not shot out like the rays of the Aurora Borealis, but gathered strength throughout its whole course, which lay through Aquarius, over the stars α and β Capricorni, through Sagittarius, across the Milky Way, and through Scorpio, passing to the N. of Antares; its visible length was therefore upwards of 100°, and as I was about to make accurate observations, it suddenly disappeared, having lasted somewhat less than one minute.

Its course was therefore nearly parallel to the Ecliptic, and about 6° to the N. of it; its breadth was from 3° to 4°; its brilliancy was equal to that of the brightest part of the Milky Way, through which it passed, and therefore allowed me to judge very accurately; and it had no colour.

Now Humboldt says in his "Cosmos,"* "I have occasionally been astonished, in the tropical climates of South America, to observe the variable intensity of the Zodiacal Light," and he considered the variation to be due to atmospheric changes, as I myself have hitherto done; but in the case above no ordinary atmospheric changes could have produced the effect observed.

It occurred June 4d. 18h. 40m. Greenwich mean time, and it would be very interesting to know whether the magnetic instruments were affected at any part of the earth.

Jamaica, June 1873 MAXWELL HALL

Meteorological Influence of Trap Rocks

THE thermometer in a mine, or coal-pit, rises, according to Herschel, 1° for every 90 feet of descent, or 58° per mile; and, according to Clerk Maxwell, the rate of increase in this country is 1° for every 50 feet of descent. These results are obtained in passing through a very small portion of the superficial crust of the earth; such, for example, as a part of the coal formation, which possesses a very low degree of conductivity. We can hardly, indeed, conceive a worse conductor than a crust consisting of alternating strata of freestone, shale, till, coal, limestone, &c. But these strata are very frequently perforated by comparatively homogeneous intrusions in the form of trap dykes, which not only possess greater conductivity, but which, from the analogy presented by volcanoes, very probably extend down to the molten matter subjacent to the external crust of the earth. Such trap dykes may be compared to an iron poker thrust through the superficial strata having its lower end in a state of fusion, and its upper end kept cool by radiation into the atmosphere. Through any continuous dyke, if this view be correct, there will therefore be a more rapid escape of heat; and when such igneous rocks occupy spaces of many square miles of the earth's surface, one would, at first sight, expect them to play a very important part in affecting the meteorological conditions of the district in which they are found. They might be expected, by the large amount of heat which they conducted freely to the earth's surface, to stimulate the growth of plants; and by the radiation of the liberated heat into the atmosphere, they ought to become—especially during night—the generators of storms, by causing a constant ascent of rarefied air. It is quite true, however, that the meteorological effects of such an agent must, as in the case of volcanoes, be observed by the far grander cycle of disturbances initiated by the solar heat; and that its agricultural efficiency may be, to a large extent, negatived by differences of chemical constitution, acidity, and exposure. Still, however, the influence is there, and ought, in one way or other, to make itself sensible.

Do any of your readers possess information bearing upon this question? Such, for example, as experiments on the conductivity of the different kinds of trap as compared with the stratified rocks, or observations of the temperature of the air, especially during night, above trap-rocks as compared with that

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* Otté's transl., vol. i. p. 131.

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